BOOK REVIEWS

Instruments and Experimentation in the History of Chemistry, F. L. Holmes and T. H. Levere, Ed., MIT Press, Cambridge, MA, 2000. xvii. + 415 pp, Cloth, ISBN 0-262-08282-9. $50.00.

This volume is part of the new "Dibner Institute Studies in the History of Science and Technology" series and contains 14 essays dealing with the evolution of chemical apparatus and laboratory techniques. Part I, entitled "The Practice of Alchemy," contains three essays covering the evolution of early distillation apparatus (Robert Anderson), the relation between alchemy and assaying (William Newman), and the problems of replicating alchemical apparatus and experiments (Lawrence Principe).

Part II, entitled "From Hales to the Chemical Revolution," contains six essays covering the evolution of apparatus for the generation and isolation of gases (Maurice Crosland), the development of the eudiometer (Trevore Levere), the evolution of Lavoisier's chemical apparatus (Frederic L. Holmes), the development of hydrometers (Bernadette Bensaude-Vincent), the development of 18th-century thermometers (Jan Golinski), and 18th-century uses of platinum and ground glass in apparatus design (William Smeaton).

Part III, entitled "The Nineteenth and Early Twentieth Centuries," contains five essays covering a reassessment of the experimental work of Wollaston and Thomson on multiple proportions (Melvyn Usselman), the development of organic combustion analysis in the period 1811-1837 (Alan Rocke), the experimental study of gun powder (Seymour Mauskopf), apparatus innovation in the work of Edward Frankland (Colin Russell), and apparatus usage in the career of Michael Polanyi (Mary Jo Nye).

One could hardly ask for a more sterling cast of contributors, nine of whom are former Dexter Award Winners. Consequently, it comes as no surprise that all of the contributions are well done and of great interest nor that many of the essays are amplifications of subjects in which the authors already have well established reputations. Regrettably this also means that there is little or no substantive coverage of events after about 1840, as the two essays by Russell and Nye, which postdate this period, are really biographical vignettes rather than focused studies of significant developments in apparatus and experimental innovation. Given that the period 1840-2000 contains some of the most spectacular advances in chemical instrumentation and laboratory technique, this omission is unfortunate and appears to be tied to another quirk of this volume (shared also by its sister volumes in the same series)—namely the total absence of any chemical historians (i.e., chemists) among the lists of contributors. Though the Division of the History of Chemistry has made many publication and symposia opportunities in the history of chemistry available to professional historians of science, this generosity in the sharing of resources appears to be a one-way street.

However amateurish some of their attempts to do chemical history may appear by modern standards, chemists have always excelled at documenting the history of their apparatus and procedures. One needs only mention the pioneering work of John Stock, L. S. Ettre's studies on the development of chromatography, or the heroic efforts of John Ferraro and his collaborators to document the post-Second World War instrumentation revolution.

With the possible exception of Hans Jenemann's recent (1997) monograph on development of the chemical balance, the individual authors appear to have done a good job in citing this literature in their individual contributions, where appropriate. The same, however, cannot be said of the book's introduction. Surely one of the responsibilities of an editor is to establish continuity between the book in question and the older literature in the field, even if this older literature no longer reflects current historiographic standards. Yet one scans the main introduction and the shorter section introductions in vain for any explicit mention of the work of John Stock, of Ernest Child's 1940 study, *The Tools of the Chemist*, or of the even earlier volume, *A Pictorial History of Chemistry*, by F. Ferschl and A. Süssenguth (1939). Despite its title, this latter work is essentially a pictorial history of chemical apparatus from alchemy through about 1850 based on the extensive displays developed by Süssenguth at the Deutsches Museum in Munich before the Second World War.

But despite these minor defects (and the reviewer readily admits to being inordinately curmudgeonly for harping on them in the first place), this volume as a whole represents a valuable and worthwhile commentary on the development of chemical, albeit "early" chemical, apparatus. *William B. Jensen, Department of Chemistry, University of Cincinnati, Cincinnati, OH, 45221-0172.*

Instrument-Experiment: Historische Studien, C. Meinel, Ed., Verlag für Geschichte der Naturwissenschaften und der Technik, Berlin-Diepholz, 2000. 423 pp, Cloth, ISBN 3-928186-51-5. 34 Euro.

This collection of 37 essays dealing with the development and impact of scientific instrumentation was commissioned by the German Society for the History of Medicine, Natural Science and Technology (Deutsche Gesellschaft für Geschichte der Medizin, Naturwissenschaft und Technik). The editor, Christoph Meinel of the University of Regensburg, has divided the contributions into six groups, entitled "Historiographic and Methodological Perspectives" (four essays), "Instruments and the Manufacturing of Reality" (eight essays), "Establishing Instrumental Procedures" (six essays), "Microscopic Views and Scientific Knowledge" (twelve essays), "Instrumentation and Social Practice" (eight essays), and "Towards the Materiality of Instruments" (seven essays).

All but three of the essays are in German and only two deal explicitly with topics relevant to the history of chemistry (Nikos Psarros, "Was sah Ostwald (als er die Brille von Frantisek Wald ablegte)?" and Anthony Travis, "Surrogate Instruments: Industrial Chemical Reactors and Organic Chemistry"). The vast majority of the remaining essays deal with topics in the history of physics, medicine, or physiology.

As can be seen from the translations of the section headers, the organization of the book is heavily influenced by current fads in the sociology and philosophy of science, and practicing scientists are likely to find themselves puzzled by some of the bizarre terminology and superficial metaphors employed in some of the more "theoretical" contributions. Nevertheless, several of the authors have managed to present straightforward factual accounts, which, despite their brevity, may prove useful to those interested in the history of instrumentation and its role in the construction and verification of scientific theories. *William B. Jensen, Department of Chemistry, University of Cincinnati, Cincinnati, OH, 45221-0172*

Gold aus dem Meer; *Die Forschungen des Nobelpreisträgers Fritz Haber in den Jaharen 1922-1927*, Ralf Hahn, GNT-Verlag, Diepholz, 1999. ISBN 3-928186-46-9, paper, 101 pp. DM 24.60.

For those who may have read about Haber's quest for gold from the ocean in his biography (D. Stoltzenberg, *Fritz Haber: Chemiker, Nobelpreisträger, Deutscher, Jude*, Wiley-VCH Verlgla GmbH, Weinheim, 1994; see review, *Bull. Hist Chem.*, **1999**, *24*, 77-78.), this booklet by Hahn will provide 100 pages of detail about the ambitious, unsuccessful venture. This gold-covered publication, the result of a master's degree study (*Magisterarbeit*), contains an introduction by Lutz Haber (1920-), youngest son of Fritz Haber and a science historian living in Bath, England.

A highly abbreviated but richly annotated biography of Fritz Haber serves as a preliminary chapter. In the following ten-page chapter, Hahn presents the background of the status of research on extraction of gold from seawater at the time Haber considered undertaking this project in the 1920s. The first proposal by J. L Proust that the sea might contain significant amounts of gold appeared surprisingly early, in 1787. A. Wurtz suggested it in a lecture in 1866, and the first recorded experiments on the subject are attributed to the British scientist E. Sonstadt, in 1872. The author describes in some detail the various methods devised for the separation and analysis of noble metals, from 1872 up to 1918, as reported by British, Norwegian, French, Swiss, and New Zealand experimentalists. This includes a comparison of the sensitivity of analyses and practicality of the methods. When Haber initiated his program, he elected to use the technique described in 1918 by H. Koch, consisting of adsorption of aqueous solutions on wood charcoal, followed by ignition and cupellation, to afford gold in the form of pellets.

The major portion of this booklet is taken up with Haber's research project on gold, carried out at the Kaiser-Wilhelm Institute in Berlin, from 1922-1927, in "Abteilung M." There is a suggestion—although undocumented—that Haber may have been given the idea to pursue extraction of gold from seawater by Arrhenius in Stockholm in June, 1920 when Haber received the Nobel Prize. The motivation for such an ambitious undertaking was the idea that recovery of gold would serve as a source of repayment of Germany's huge war debt, amounting to over 200 billion Goldmarks. Even reduced to 132 billion by 1921, this sum would have been the equivalent of 50,000 tons of gold. The research got underway by 1922; carried out by Haber's institute associates, it led to six doctoral dissertations in the next six years. One of those doctoral students, Johannes Jaenicke, published a short description of the project in *Die Naturwissenschaften* in 1935 but also provided bountiful documents, which are housed in the archives at the Max-Planck-Gesellschaft, Berlin-Dahlem. Like the biographer Stoltzenberg, Hahn depended heavily on these documents for his research. Preliminary experiments were directed toward effective workup and analysis of gold-containing samples, mostly synthetic. The author provides substantial detail on various separation and analytical designs, which are not included in this review. Results from the sparse number of real seawater samples were disappointingly lower than those reported by earlier researchers. Perhaps Haber sensed the project would entail more elaborate support to be successful, for he turned to external sources for financial backing. Ever skilled in such collaborations, he eventually arranged the establishment of a consortium with Degussa and Metallgesellschaft. Haber was to provide the scientific expertise, while Degussa and Metallgesellschaft would finance the project up to $100,000. Moreover, in all decision making, Haber would hold two votes to one each for the other two participants. Any financial gain to be realized would be distributed, 50% to Haber, and the other half equally divided between Degussa and Metallgesellschaft. Author Hahn notes that archival material from Metallgesellschaft served as a valuable resource for his historical research and that his request to use records from Hapag, Hamburg, were denied. No mention is made of any materials from Degussa.

By the summer of 1923 plans were in place for an expedition in the Atlantic Ocean. On board the *Hansa*, a ship of the Hamburg-America line, two cabins were outfitted as laboratories and sleeping quarters for Haber and three coworkers, who took samples and analyzed them during the round trip from Hamburg to New York in July and August. A second expedition in September afforded fewer results than the first, which had been erratic. In October a third expedition, on board the *Württemberg*, also a ship of the Hamburg-America line, headed for Buenos Aires, this trip having been financed by the German Navy and "Notgemeinschaft." As with the first *Hansa* expedition, Haber was on hand, along with three doctoral students who took samples and performed analyses in a newly designed and improved labo-

ratory. The values for gold content were even lower than those from the two earlier excursions; this raised questions about the efficacy of the ever changing methods and the possible uneven distribution of gold in the oceans. Still fairly optimistic, Haber gave a lecture in Buenos Aires before the German Club; and in the spring of 1924 in Dahlem he spoke at the second conference on "Seejod." There followed yet two more sea voyages, one on board the *Poisedon* in the North Sea in May, 1924, the other in April, 1925 on the *Meteor*, which made 14 round trips between Africa and South America, while the scientists on board took copious samples. Most were analyzed back at the Kaiser-Wilhelm Institute. Haber arranged for seawater samples to be sent to Berlin for analysis from Iceland, Greenland, the San Francisco Bay, and even from the Rhein River near Karlsruhe. From the *Meteor* expedition 1,635 samples were collected and 85% of them eventually analyzed back in Berlin. The average gold content was 4×10^{-3} mg/ton of seawater; this was deemed to be 1/1,000 the amount for a viable extraction process. At this point Haber pronounced the project hopeless. In a lecture in May, 1926, entitled "Gold in the Sea," Haber asserted he had given up searching for the needle in the haystack!

In a brief summary, the author brings us up to the present day. During the quest for gold between 1920 and 1926, Haber experienced no competition; yet other reports of gold detection came out between 1927 and the early 1940s, all values being low and in the same range as those of Haber. With the development of new analytical techniques, such as neutron activation, the field is still being studied, as indicated by various patent applications. Yet the average concentration reported in the 1990s—10^{-2} mg/ton is not for from the final average figure from Haber's work.

Hahn concludes his richly documented and illustrated booklet with Roald Hoffmann's poem, "Fritz Haber (1993)." *Paul R. Jones, University of Michigan.*

Science and Engineering in Ireland in 1798: A Time of Revolution, P. N. W. Jackson, Ed., Royal Irish Academy, Dublin, 2000. viii + 81 pp, paper, ISBN 1-874045-77-1. IR £5.00.

This collection of five essays is the outcome of the proceedings of a symposium organized by the National (Irish) Committee for the History and Philosophy of Science, held in November, 1998, as a bicentennial recognition of the 1798 rebellion of the United Irishmen. Authors are affiliated with Queen's University, Belfast; Trinity College, Dulbin, or University College, Dublin. Three of the chapters cover the status of some of the sciences at the time of the rebellion: biology; geology; and science, engineering and the military. Of particular interest to chemists will be the remaining two chapters on two chemists, both of whom ended up in careers in the United States: William James MacNeven (1763-1841) and John Patten Emmet (1796-1842). Neither chemist is indexed in Ihde's *Development of Modern Chemistry*; only MacNeven appears in Partington's history, although both are included in Miles and Gould, *American Chemists and Chemical Engineers*, 2nd ed. (1994). While MacNeven's professional career at Columbia College of Physicians and Surgeons, both in medicine and later in chemistry, is well covered by Miles, the Irish publication includes MacNeven's involvement in the abortive rebellion and other background before he emigrated to the US. Emmet migrated with the rest of his family to the US as a child; it was his father who participated in the rebellion and was imprisoned for a time. In New York he was educated by a Trinity College graduate, Richard W. Thompson, and then studied medicine under MacNeven. Emmet became adept in laboratory skills and was also a talented artist. Eventually he became Professor of the School of Natural History at the University of Virginia, publishing several articles in analytical chemistry and electrochemistry, among other topics. A complete list of his publications is included in this essay, along with some of his original sketches. Both articles on MacNeven and Emmet are enhanced with figures from the Irish Rebellion, photographs of the two chemists and Emmet's wife, of title pages from MacNeven's popular texts, of the original Rutgers Medical College (co-founded by MacNeven), of the monument to MacNeven in New York, and a reproduction of Thomas Jefferson's hand written invitation to Emmet for the faculty position in Charlotte. *Paul R. Jones, University of Michigan.*

The Biographical Dictionary of Women in Science: Pioneering Lives from Ancient Times to the Mid-20th Century, Marilyn Ogilvie and Joy Harvey, Ed. 2 vol., Routledge, New York and London, 2000. xxxviii + 1499 pp, $250.

This extensive compilation is an expansion and updating of Marilyn Ogilvie's earlier biographical dictionary, *Women in Science, Antiquity Through the Nineteenth Century* (1986). Embracing a broad range of women taking part in scientific or science-oriented work, from public health activists and alchemists to writers and zoologists, it covers a span of 2500 years and includes people from all five continents. In addition to the narrative texts that form the body of the work, there are three sets of lists of women by occupation, time period, and country or geographical region. A very good bibliography of about 200 standard sources covering material up to 1998 is also included. The volumes are handsomely bound; type is clear on glossy paper; names are easy to spot on the page; and there is a good general index.

Entries follow a uniform format but vary in length depending on the prominence of the subject and the amount of information found by the writers. Thus, on looking at chemists in particular, several pages are devoted to Marie Curie; early Massachusetts Institute of Technology instructor Ellen Swallow Richards (also known for her pioneering work in home economics) is discussed in an article of medium length. Lesser players in the drama and many for whom information is less readily accessible are afforded coverage in only a paragraph or two—such as the tantalizingly brief glimpse of Leonora Bilger (born 1893), a successful early chemist, Garvan medalist, and department head at the University of Hawaii from 1943 to 1954. A short but interesting sketch is offered of the career of Mary Peters Fieser, wife and research colleague of Louis Fieser and the co-author of the famous Fieser and Fieser texts so well-known to many of us. Greek-born bacteriologist and social activist Amalia Coutsouris Fleming, second wife of Sir Alexander Fleming of penicillin fame and his co-worker in investigations on streptomycin, is also included. Overall, the work shows signs of haste with many typographical errors and other more important oversights which have the unfortunate effect of shaking one's confidence in the work as a whole. The reader with scientific background especially may well be somewhat disappointed. To this reviewer the standard does not match that of Marilyn Ogilvie's 1986 *Dictionary*, either in the overall quality of the articles or the factual accuracy. Unfortunately there are occasional difficulties with basic information. For instance late nineteenth-century Italian bacteriologist Giuseppina Cattani's last name is spelled consistently as Catani, and early twentieth-century British chemist Alice Emily Smith is designated as having the working life 1850-1905. In Smith's case the confusion arose from the fact that a scholarship she held as a student commemorated the Great Exhibition which took place in London in 1851; she herself published her first paper jointly with W. H. Perkin Jr. in 1902, and she remained very active in research and publication until at least 1909.

A number of entries that have been carried over essentially unchanged from the earlier edition remain very adequate, such as those on Marie Curie and Ellen Swallow Richards. However, in some cases updating would have been appropriate, as in the discussion of the work of French mathematician Sophie Germain. It is no longer the case (as it was in 1986) that Fermat's Last Theorem is unproven, the task having been accomplished by Andrew Wiles in 1995; and although Germain's work remained an important contribution referred to by others for many decades, Wiles's proof does not depend on it but rather on tools developed long after her day. New entries written by scientists and contributors who have made extensive studies of the person under discussion are good, such as that on early twentieth-century German physicist Hertha Sponer-Franck, professor at Duke University for almost thirty years and remembered for her quantum mechanical studies, including investigations of structural properties of complex molecules.

One might wish that the assistance and guidance of specialists in the fields had been used more extensively so as to reduce difficulties with discussions of technical work and provide somewhat fuller coverage. A number of articles on women chemists published during the last fifteen years in the *Bulletin for the History of Chemistry* have not been consulted, and neither has Volume 2 of *American Chemists and Chemical Engineers* (W. Miles and R. Gould, 1994). These sources could have provided needed additional information. However, the editors will undoubtedly correct in later editions such rather serious errors as those which detract from the presentation of the work of American bacteriologist/biochemist Rebecca Lancefield ("Lancefield found evidence that countered the accepted belief that type-specific virulences [*sic*] were carbohydrates of [*sic*] polysaccharides," p 739). It is perhaps something of an exaggera-

tion to claim Mt. Holyoke botanist and general sciences instructor Lydia Shattuck as "one of the founders of the American Chemical Society (p 1182)."

As noted in the editors' introduction, the more ready accessibility of source materials biases the coverage in favor of the United States. Nevertheless, women of France, Germany, and especially Britain are also fairly well represented. Some entries for which the available source material is plentiful but in non-English language publications are disappointingly brief—which is perhaps understandable in a work of this size since the labor of translating can be time consuming. The articles on Russian women, while a welcome addition to the somewhat meager coverage of this national group in English language sources, hardly reflect the tremendous increase in the participation of women in scientific work during the Soviet era.

A few words concerning the interpretation of the lists of women by occupation, by time period, and by nationality are perhaps in order since these lists are important in fulfilling one of the editors' stated hopes: namely, that this dictionary will provide a unique opportunity to view subjects "longitudinally within fields over a long period of time or horizontally across fields within a restricted time period (Introduction, xi)." The lists run into the problems typical of such categorization attempts. While their lengths offer approximate indications of the growth of women's participation in scientific work over time, the extent to which women penetrated into particular fields, and the countries in which they have been most successful, the overlaps between divisions within each list mean that simple enumeration might well give one a somewhat exaggerated idea of the extent of women's activity in science. This also holds for a comparison of fields within individual countries. (Here the overall bias towards the United States is not a complicating factor.) Thus chemist Charlotte Roberts of Wellesley College appears in both nineteenth- and twentieth-century lists; mid-westerner Laura Linton, who during her years in chemistry carried out a mineral analysis in addition to her rather notable, but not mentioned work in petroleum chemistry, appears under both chemists and mineralogists (as well as under physicians and educators, reflecting other periods of her career). There are also some unexpected and unexplained editorial choices. For instance, why present two lists of Dutch women separated under the headings "Holland" and "Netherlands"? And why place nineteenth-century St. Petersburg chemist Anna Volkova, a protégée of Mendeleev, in the listing headed "USSR" rather than in that headed "Russia"? Even with the lists and the impressively large number of subjects included, it is somewhat difficult to see this dictionary as meeting the editors' hope of offering a "unique perspective" for international and cross disciplinary comparisons; its basic style and methodology keep it too firmly anchored in the standard pattern for dictionaries of women in science.

Critical judgment of the work of some of the more eccentric women appearing in this very inclusive collection is rarely offered. Mary Boole, widow of the famous nineteenth-century British mathematician George Boole, developed and published pioneering ideas on the teaching of mathematical concepts to young children, ideas of continuing interest to educational psychologists; however, it might have been advisable to acknowledge that at the same time, caught up in current psychic research and related fads, Mary Boole brought out a considerable amount of what is best described as nonsense. Likewise, while the entry on nineteenth-/twentieth-century Paris-based feminist and writer Céline Renooz offers a fairly realistic assessment of Renooz's wildly extravagant conjectures about current science and the development of human cultures, the discussion of Renooz's contemporary Clémence Royer is somewhat less balanced. Science writer and commentator Royer, author of the first French translation of Darwin's *Origin of Species*, has her enthusiastic supporters among historians, but others advocate a more cautious approach. Some mention might have been made of the fact that Royer was a convinced Lamarckian who failed to grasp the essential difference between Lamarck's ideas of evolution and Darwin's theory of natural selection—a failure which distorted her translation. As well as making the dictionary articles more bland and less interesting than they otherwise might have been, this very delicate approach will make it difficult for the uninitiated reader to form a realistic idea of the importance of the person under discussion.

Readers already familiar with the field of women in science will find here new names; specialists will also quickly realize they need to take the precaution of checking the details provided. On the other hand, those who have little background in the subject, particularly beginning students, should approach these volumes with caution. Although the basic information of nationality, time period, and area and general extent of scientific activity of this large collection of women of science provides a useful point of entry, careful scrutiny of additional information is recommended.

Despite the caveats, the fact remains that this dictionary is a noble effort, the product of a very considerable amount of labor on the part of the two editors, who have themselves written a large fraction of the articles. They are to be commended for making available in one location a great many names of women scientists; the work will unquestionably remain an essential, standard reference in American libraries for many years. *Mary R. S. Creese, Hall Center for the Humanities, University of Kansas, Lawrence, KS 66045.*

Auf der Suche nach dem Stein der Weisen: Die Geschichte der Alchemie. Hans-Werner Schütt, Verlag C. H. Beck, Munich, 2000. 602 pp, DM 68.50.

The history of alchemy has come into its own in recent years, the Renaissance and early modern periods having been particularly well covered by such eminent scholars as Allen Debus, Betty Jo Dobbs, Karin Figala, Owen Hannaway, William Newman, Lawrence Principe, and Pamela Smith. What has been lacking is an up-to-date recounting of the entire span of alchemical history, from antiquity to the modern period. The most recent such surveys are now nearly a half century old. (Readers should be aware, however, of the admirable *Alchemie: Lexikon einer hermetischen Wissenschaft*, edited by Claus Priesner and Karin Figala, and published by Beck Verlag in 1998.)

In the book under review, the outstanding historian of chemistry Hans-Werner Schütt provides us with such a history. Here, in 600 pages and close to a hundred short chapters, is an examination of the full range of alchemical lore; beginning "in the shadows of the pyramids," Schütt progresses through "foreign worlds" (the Arabic period), then "into monasteries and elsewhere" (the middle ages), and finally "into the new world of Europe." In an afterword, Schütt notes that it was not his intent to provide a scholarly investigation of the subject that seeks novel understanding. Rather, his aim was to get under the skin and into the minds of the alchemists of various times and places. This included, for Schütt, mining matters "anecdotal, philosophical, psychological, and political," in the hope of presenting, as Golo Mann put it, "what is uncommonly entertaining in history." In this way, he concluded, he could steer safely between the Scylla of "professorial incomprehensibility" and the Charybdis of "cheap popular showmanship."

Schütt's navigation was up to the task. The book is well organized, lively, and chock filled with interesting matter. The writing is effective and often suffused with a deliciously wry sense of humor. In some respects Schütt was overly modest in his protestations, for there is much that is novel and sometimes even profound here. One example is a wonderful passage on what might be called the teleology of everyday life, an effective piece of rhetoric that allows entrée into the teleological psychology of alchemy (pp 63-64).

In another fascinating passage (pp 495-497), Schütt relates his experiments attempting to reproduce some of the observations of the alchemists. Similar to Lawrence Principe's work of a few years ago, Schütt succeeded in showing that various puzzling reports in the alchemical literature really do make sense as a result of laboratory operations. His report, interlaced with precise details of time, place, and witnesses (or lack thereof), is strikingly reminiscent of some of the alchemical narratives themselves.

Schütt wanted to appeal to the broadest possible audience and so kept his scholarly apparatus to the minimum: about 300 footnotes in all (most of them textual rather than source citations), and four pages of bibliography. This poses a disadvantage for scholars of the history of alchemy, which is ameliorated by Schütt's maintenance of a website associated with his book (http://www.tu-berlin.de/fb1/alchemie) that provides a much fuller bibliography.

Still, it must be clearly stated that Schütt has performed an enormous service for the field. His history of alchemy will immediately become the standard general treatment and will go far to raise interest in the field among general readers. One can only hope that this admirable book will soon be translated into English. *Alan J. Rocke, History of Technology & Science, 1141 East Blvd., Case Western Reserve University, Cleveland, OH 44106-7107*

Arnold O. Beckman: One Hundred Years of Excellence, Arnold Thackray and Minor Myers, Jr. Chemical Heritage Foundation, Philadelphia, PA 2000, 379 pp. $65.00.

What a grand celebration! A celebration of 100 years of inexhaustible contributions to the advancement of science, technology, education and the quality of life. A true attainment of the American Dream! (And this reviewer knows something about centennials and celebrations, currently experiencing the centennial year of the National Institute of Standards and Technology.)

Chronologically organized, this book is more than just the life and times of Arnold Beckman; it is a chronicle of chemistry in the 20th century. No, it is more than just about chemistry, it covers all of science and engineering. Whom are we kidding? This book is about life in the United States of America!

Beginning with his early years in Illinois, we see an engaging youth filled with curiosity (these days often this same spirit might be viewed as non-PC, if not illegal!). Forced to learn piano by a loving mother, he proved these talents to be invaluable in his summer jaunt across the country via freight train! The reader learns about his first chemistry set, his woodworking skills, his toils on a threshing machine, and much more. This level of intricate and personal detail persists throughout the book, as Dr. Beckman's life is traced from birth through his schools years, military service, and his three "careers" – from professor to entrepreneur to philanthropist. His devotion to his wife and family is not neglected and is neatly woven into this amazing legend. The pictures and vignettes interspersed throughout the book (a veritable Who's Who in America) bring to life and personalize the warm friendly discourses of the authors. If a picture is worth a thousand words, this book amounts to hundreds of volumes. Truly these authors know Arnold Beckman. It is absolutely impossible, as much as the ardent reader might want, to read this book from cover to cover in one sitting. There is just too much for the mind to absorb. No, one has to allow each section to sink in, sometimes letting days or weeks pass before picking it up again. But one will be drawn back to read more until the end, then beg for more.

And there is more. Tucked neatly before the hardbound back cover is a compact computer disk. This CD is the icing on the cake. The CD adds additional auditory and visual stimulation to the "reader." Without the CD the book is a magnificent work of art. With the CD, the reader becomes all that more familiar with Arnold Beckman. When finished, the reader truly feels as if he knows Arnold Beckman and, given the opportunity, would greet him as a friend.

If there is a downside to the book, it is that it is too big and heavy. This review would have reached you much sooner, could I have carted it along with me through airports. Even as a coffee-table book, I am afraid it is a bit large. So I am concerned that it will be relegated to the bottom shelf of the bookcase (where all the over-sized books are placed) and forgotten. This would be a terrible tragedy.

Let me end with a quote from Dr. Beckman: "I'd like to get young kids interested in science... The young mind is inquisitive enough that you don't have to worry

about scaring up enthusiasm; you simply need to keep them interested and excited about science." This book should be required reading for all aspiring scientists and engineers (especially chemists), as well as modern history majors—not as a text book, but as a philosophical and inspirational reading. This book will keep them interested and excited about science. *William F. Koch, National Institute of Standards and Technology, Chemical Science and Technology Laboratory, Gaithersburg, Maryland 20899-8300.*

The Partington Prize

The Society for the History of Alchemy and Chemistry has established the Partington Prize in memory of Professor James Riddick Partington, the Society's first Chairman. It is awarded every three years for an original and unpublished essay on any aspect of the history of alchemy or chemistry. The prize consists of two hundred and fifty pounds (£250).

The competition is open to anyone with a scholarly interest in the history of alchemy or chemistry who has not reached 35 years of age by the closing date, December 31, 2002. Scholars from any country may enter for the competition, but entries must be submitted in English, typewritten or wordprocessed and double spaced on one side of the paper. Essays must be fully documented with the conventions used in recent issues of *Ambix*. Essays must not exceed 5000 words in length, excluding references and footnotes. All entries must be submitted with a word count. The prize winning essay will be considered for publication in *Ambix*, but publication cannot be guaranteed.

All entries should be sent to the Hon. Secretary of the Society, J. A. Hudson, Applied Sciences, Anglia Polytechnic University, East Road, Cambridge CB1 1PT, England, with the words 'Partington Prize' written clearly on the envelope. Each entry should contain a separate title page with the author's name, institution, address, and date of birth; this information will not be made available to the judges. Essays (only one from each competitor) must be received no later than December 31 , 2002.

The decision of the judges appointed by the Council will be final. The Society reserves the right to divide the prize between two or more entries of equal merit, or not to award a prize should no essay be deemed of suitable standard.

The name of the winner will be announced by April 30, 2003, and all essays will be returned to competitors soon after that date.

John Hudson, Hon. Secretary